CPUC and PG&E Analysis of Reported Versus Evaluated Savings Results for PG&E's 2006 to 2008 Energy Efficiency Portfolio

This analysis shows and explains the variance between PG&E's reported 2006-2008 net energy savings of 5,251 GWh, and evaluated net savings of 1,766 GWh. The analysis finds that about 2/3 of the net energy savings adjustment of 3,485 GWh was realized (i.e., actually occurred) in California, but may not have been directly attributable to PG&E intervention.

Final Assessment 2015

Introduction:

This document highlights the results of a joint analysis conducted by the California Public Utilities Commission (CPUC) Staff and PG&E to clarify the variance between PG&E's reported net energy savings of 5,251 GWh and the CPUC's net evaluated savings of 1,766 GWh. Both parties saw the need to understand the sources for this large variance to guide future energy efficiency evaluation procedures and implementation efforts. The analysis is also useful for explaining these results to stakeholders. The exercise also highlighted strenghts in the accessibility and granularity of data available, and identified enhancements that would make future evaluation results more accessible, transparent and easier to replicate.

It is important to realize that PG&E's reported energy savings in 2006-2008 were based on CPUC approved estimates of savings potential for energy efficiency measures derived from previous evaluations. A number of assumptions for certain parameters were updated based on field data collected during the 2006-2008 energy efficiency evaluation cycle. This analysis represents an joint effort on the part of the CPUC and PG&E to quantify and explain the changes and adjustments.

Results:

Key results are discussed here and are followed by a graphical depiction of the sources of variance in Figure 1.

PG&E's 2006-2008 Energy Efficiency Portfolio remained cost-effective irrespective of these adjustments, i.e. the portfolio was cost effective even at the evaluated Net Savings of 1,766 GWh. The Total Resource Cost (TRC) test benefit/cost was 1.17 and the Program Administrator Cost (PAC) test benefit/cost was 1.47 (See CPUC's 2006-2008 Energy Efficiency Evaluation Report, Table 2).

Roughly 75% (3,812/5,251) of the reported net energy savings were realized by society. These represent energy savings that occurred and benefited California. The evaluators did not credit all of these savings to PG&E, because some savings occurred after the 2006-2008 program cycle, some savings were attributed to updating facilities to meet building codes, or some savings were judged to have occurred in the absence of the program (due to free ridership).

The largest sources of variance were due to differences in when energy savings calculations were performed. PG&E developed its reported savings values, based on the best information available at the time, including guidance provided by the CPUC-ED. The CPUC-ED evaluators conducted their evaluation *after* programs had been implemented, using updated information and assumptions that were gained through field work. Consequently, as assumptions changed in the savings estimation calculations, so did some savings estimates.

A significant portion of the downward adjustment reflects the success of the upstream CFL program in transforming the California residential lighting market. The Average CFL Unit Energy Savings (UES) adjustment (-598 GWh) is an indicator of the upstream lighting program's success at accelerating the uptake of CFLs in California. PG&E incented nearly 54 million CFLs during 2006-2008. During these three years, customers ended up installing CFLs in lower-use, lower wattage sockets, because the program had succeeded in saturating the high-use, high wattage sockets.

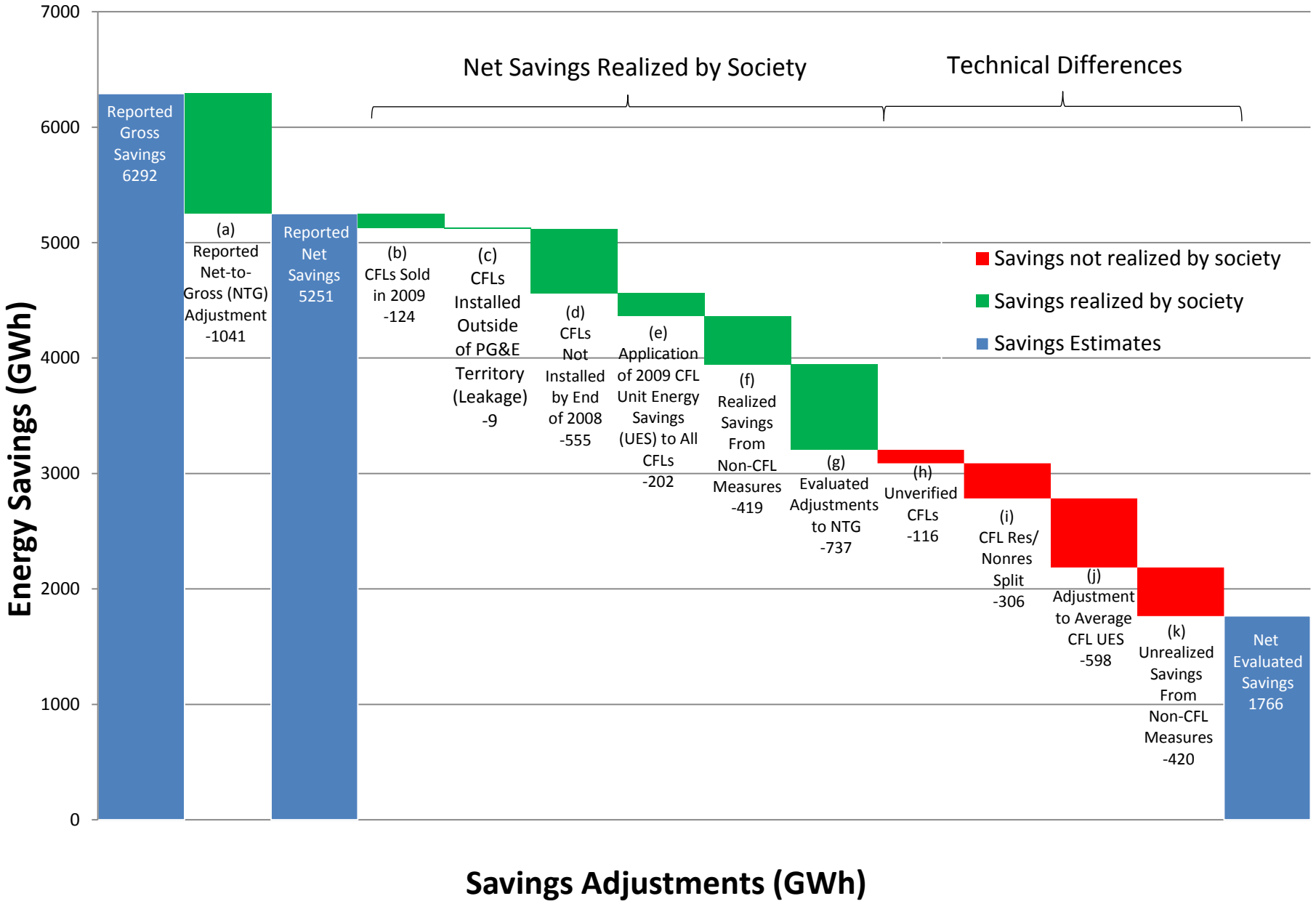
Evaluation practice has improved based on 2006-2008 experience. This exercise identified improvements that would enhance the transparency of, and facilitate future replication and comparisons of program and portfolio-wide results as well as highlighting the value of the detailed information that was collected. The CPUC-ED and IOUs continue to work on providing timelier evaluation-feedback to program implementation. The ex-ante review (EAR) process has been instituted to enable evaluators to be present earlier in a custom project's lifecycle and reach consensus on savings estimates. Impact evaluation efforts are focused in areas where most of the variance is expected to occur. Data and reporting by the IOUs and the CPUC-ED have improved. The increased detail in the utility's project files and the CPUC's evaluation reports, especially including clearer descriptions of algorithms and the values used in them, provides more

transparent analyses and facilitates replication and comparison of results. Prior to 2006-2008, the comparisons presented in this document would not have been possible due to the disaggregated approach to evaluation and lack of linkages from reported savings to evaluated savings on a measure and parameter basis. All of the information that enabled this analysis is publically available.

Methodology:

PG&E evaluation staff and the CPUC-ED's consultant ("the analysis team") reviewed the 2006-2008 program evaluations of PG&E's energy efficiency portfolio. The compact fluorescent lamps (CFLs) component of the Upstream Lighting Program (ULP) was the largest source of variance. Consequently, the analysis team focused on investigating the savings variances in the evaluation of CFLs in the 2006-2008 ULP. Working from PG&E's CFLs tracking data and reported savings and the CPUC-ED's portfolio-wide database of results, the analysis team reviewed and re-calculated the savings reductions in each of the seven adjustments to CFLs savings that were done in the 2006-2008 ULP evaluation. In addition, the analysis team investigated the savings variances for non-CFL measures, including those incented in agricultural, industrial, commercial, and food processing programs. After the analysis team developed final estimates for the savings reductions, they classified the savings reductions as realized (i.e., energy savings that did occur but were not attributed to PG&E) or unrealized (i.e., energy savings that did not occur).

Figure 1. Adjustments to PG&E Reported Savings by CPUC in 2006-2008 PG&E Energy Efficiency Portfolio



The following primary factors explain the variance between PG&E's reported electricity savings and the CPUC-ED's evaluated electricity savings estimate for the 2006 to 2008 portfolio of energy efficiency programs shown in Figure 1. The descriptions also explain why the analysis team identified each adjustment as realized or unrealized.

(a) Reported Net-to-Gross (NTG) Adjustment. PG&E reduced its reported total gross savings by 1,041 GWh using measure-specific NTG values in accordance with CPUC guidance, which was known to be high at the time. The reported portfolio average NTG=0.83. These savings were realized by society.
(b) CFLs Sold in 2009. Some CFLs incented in 2008 were purchased by customers in early 2009. The associated savings were credited to 2009, and reduced the 2008 evaluated savings estimates. These savings were realized by society because these lamps were eventually installed, just not during the program cycle.
(c) CFL Installed Outside of PG&E Territory (Leakage). A tiny portion (~ 0.45%) of CFLs was estimated to have been sold to non-PG&E (primarily SMUD) customers. These savings were realized by society because these lamps were installed in California.
(d) CFLs Not Installed by the End of 2008. The evaluation found significant amounts of CFLs in storage, as many customers were waiting for incandescent bulbs to burn out before installing the program CFLs. The evaluators also found that almost all (99%) of these CFLs were eventually installed. Per CPUC evaluation guidance, savings from bulbs installed after 2008 were counted in later years. In addition, about 2% of residential and 7% of non-residential CFLs burned out by the time evaluation was conducted and were not counted in evaluated 2006-2008 savings estimates. These savings were realized by society.
(e) Application of the 2009 CFL Unit Energy Savings (UES) to All CFLs. When developing the UES for CFLs for the reported savings values, PG&E used the 2005 UES assumption. In contrast, for the evaluation, the CPUC-ED applied the ex post UES from the 2006-2008 evaluation report which was available in 2009 to all 2006-2008 program bulbs. For the 2006-2008 period, the UES for bulbs installed early in the program cycle probably had savings estimates that were closer to the 2005 UES assumption, while those installed later had savings estimates that were closer to the assumption in the 2006-2008 ex post evaluation UES which came out in 2009. This adjustment, which is an additional adjustment to (j), is classified as savings that were realized by society. In future analyses the CPUC-ED applied a year specific UES value.
(f) Realized Savings from Non-CFL Measures. This is the portion of adjustments to savings from non-CFL measures that were likely realized by society. This adjustment represents adjustments to agricultural, commercial, industrial, and other residential (non-CFL) measures. Often the baseline used existing equipment, whereas evaluators set a different baseline. These savings were realized by society.
(g) Evaluated Adjustments to NTG. The CPUC-ED evaluators estimated higher levels of free ridership, based on new data collection from the field, than those used by PG&E (a), per CPUC guidance. These savings were realized by society.
(h) Unverified CFLs. PG&E tracking database records verified 96% of the reported incented CFLs.
(i) CFL Res/Nonres Split. PG&E's reported savings assumed a 90/10 residential/non-residential split – i.e. 90% of the CFLs incented upstream were assumed to be installed in residences and 10% in non-residential locations. The CPUC-ED evaluation assumed a 94/6 residential/non-residential split. Since non-residential bulbs typically have higher hours of use (HOU) and have higher baseline wattages, the change resulted in lower evaluated savings.
(j) Adjustment to Average CFL UES. This adjustment captures the reduction in CFLs' UES in 2006-2008, where PG&E incented almost 54 million CFLs. As CFL market penetration increased, customers replaced lower wattage, less used, incandescent bulbs. For example, early installations may have been in kitchens and bathrooms, with later installations in closets and garages. This reduction in the average UES per CFL results in lower savings.
(k) Unrealized Savings From Non-CFL Measures. This is the portion of adjustments to savings from non-CFL measures that likely were not realized by society. The primary reasons for these adjustments included reduced facility operating hours due to the recession, reduced UES, verification losses, and calculation errors.

References

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